Islamic Relief Worldwide

South Sudan

TERMS OF REFERENCE FOR CONSTRUCTION OF TWO COMPLETE UNITS SOLAR POWERED MINI WATER YARD WITH DRIP IRRIGATION COMPONENT.

Location: Narus payam (Kapoeta east county)

Donor: – SOUTH SUDAN.

Project: FLIP

Job Title: Construction of two complete unit of solar powered mini water yards with drip irrigation component.

Background

Islamic Relief Worldwide- South Sudan is an international humanitarian organization that has been working with vulnerable communities in South Sudan since 2004 towards emergency relief and recovery interventions. IRSS is responding to priority needs of the drought affected population in Kapoeta east county of eastern equatorial state. IRSS is currently implementing a recovery project in Kapoeta east county . The objective of the project is to increase and improve the status of food security livelihood of the population in the targeted villages of Narus payam.

In order to achieve these objectives Islamic relief intends to construct two (02) solar powered mini water yard with component of drip irrigation in Narus payam of Kapoeta east county . In this regard IRSS is sourcing for a competent bidder to carry out the construction of the proposed project of the water supply system.

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Scope of Work:

Lis of project locations

S/no	Name of village	Boma	Payam	Distance from the center
01	Lopua	Lopua	Narus	18 km
02	Lolim	Lolim	Narus	8 km

Item (1) water source development:

A. Hydro geophysical survey.

- To conduct a proper hydro geophysical survey of the two project sites using appropriate methods for the job that would determine the most promising and potential site that provides good prospect for drilling of a high yield borehole .
- The hydro geophysical survey is expected to use resistivity equipment - ABEM Terrameter SAS 1000 or equipment of any model that can perform similar job .
- Provide a detailed hydro geophysical survey report giving details of the findings and recommendations.
- The borehole site shall be projected with the aid of a combined Hydro geological, geophysical assessment and relation to farm lands sites.
- Possible environmental impact on the proposed borehole should be clearly projected if any .

B. **Bore well drilling**:-

The drilling of the bore well should be carried out according to the characteristics of the soil formation of the site, as per result of the hydro geophysical survey while using proper drilling tools, drill pipes, casing pipes with centralizers to ensure that casing string is central within the hole.

- The expected bore well diameter is 9 inches.
- The expected casing diameter is 6 inches.
- The expected depth of the bore well is between 80 – 120 meters.
- The expected output from the bore well is a minimum of 5,000 liters per hour

Screen casing –6 inches factory made U- Pvc slotted screens will be used throughout the aquifer zone. The slot size and screen length will depend on the aquifer materials and aquifer thickness placed at

appropriate positions and depth. Screens should be of an ISO standard and having the specification U-pvc class 9/10 drinking water standard non- toxic.

Plain casing – 6 inches casing should be of ISO standard U-pvc class 10 drinking water standard , 3 meters long with threaded joints , well screwed , appropriately placed in the correct positions in the non aquifer zones of the well ..

Permanent casing – 8 inches Permanent casing must go up to the top of the hard (rock) formation, to ensure that it seals off all materials from surface runoff entering the well and not less than 6 meters .

Development – on completion of drilling , an appropriate development method will be applied this can include flushing out for a period not less than 10 hours , meanwhile estimating the discharge rate . This is necessary to obtain the maximum yield of the well.

Gravel packing – Gravel packing material shall be supplied and install all along the aquifer section of the well. The material shall be 2mm – 4 mm diameter, clean, well rounded siliceous material with not more than 5% of non- siliceous materials. Sanitary seal should be installed at an appropriate depth using recommended cement grout materials, up to 1.50 m deep .

Pumping test - Pumping test will be performed for a period not less than 10 hours in which the first 4 hours is for step draw down while the 6 hours for continuous test . The discharge at this point will be correlate to the discharge during flushing. A pumping test report should be included in the borehole completion report, to guide on the size of the submersible pump to be installed.

Recovery test – recovery test should be done for at least 2 hours or such time when there is at least 80% of the static water level noted. The result for the pumping test should guide in determining the capacity of the pump appropriate for the well -

Well head – I MK II pedestal should be used on the well head, well fixed in 1:2:4 cement, sand aggregate mix fitted up to the installation mark of the pedestal reaching the sanitary seal , fixed with bolts , all enclosed in a brick work man hole chamber with a metal cover over it .

C. **Solar powered submersible pump**

- A solar powered submersible pump of capacity Q = 3,500 liters /hr , H = 100 m , single phase , 2 - 3 HP , 1,400 Watts shall be installed. The identified pump should be approved by IRSS engineer before installation.
- Solar panels to the required capacity (1,400 Watts) for provision of power needed by the pump per required quantity of water per the given time will be installed as the source of energy to the pump. 100 or 120 Watts solar panels is preferred.

- The solar panels in array is expected to be mounted on top of the tank (overhead) , and firmly supported on metal frames , all other accessories well fixed in place .

D. **Storage reservoir and tank stand .**

- The water storage facility will be 2 PE plastic tanks of capacity 5,000 liters each mounted on a metal stand appropriately designed to support the full weight of the tank full of water, weight of three people doing services and weight of the solar panels on top.
- The tank stand is expected to have a cage all around for protection of people doing services, the cage should be protected from inside with a panel work of G.C.I sheets 1.20 m height well fixed using self drive nails , this necessary to protect the plastic tank from being damaged with sharp objects.
- The height of the tank stand from ground level will not be less than 6 meters, however, this will be determined by the hydraulic gradient of the site in respect to pressure required to get water to the discharge points.
- The tank stand should be a six legged one, fabricated using 100mmx100mm hollow section pipes for tower legs , primary and secondary bearers should be of 100mmx100mm hollow section too , upper bearer placed at 500mm spacing . Ensure the tank is place on a flat iron plate placed above the upper bearers. Tank stand installed on 40cmx40cm R.C.footings 1:2: 4 plain concrete 6 No , on 60cmx60cm 10 cm thick concrete on bottom of the footing trench .

E. **Water collection points**.

Provision and allow for installation of one water collection point with one ¾" tape , fixed on 1.50mx1.50m apron with a drainage channel . The water collection point will be installed 4.00m from the tank using 1" G.I.pipe casted in concrete work 8" diameter, 0.80m height .

F . Fencings:-

The area around the water tank shall be properly fenced using 2 1/2"x 2 1/2" angled iron bar as posts and chain link wires to a total perimeter of 24 meters, with one access metal gate .

Item (2) Drip irrigation system development

Technical specifications:

Purpose: the drip system is intended to provide water to soil surface and maintain constant moisture required over specific soil surface area for specific period of time .

- Size of land surface - the drip system is expected to cover a land surface area of : length 70.00mx width 60.00m = 4,200 square meters.
- The 2 inches main line runs straight from the out –let through the middle of the land to a length of 70 .00m dividing the field into two equal chambers 30.00m on each side .

- Two 11/2 inches PVC sub main lines , 70.00 m long each runs parallel to and on either side of the main line , and connected on four points to the main line with 11/2 " connectors gate valves 4 no as specified in the technical notes .
- ¾ inches drip lines (drip pipes) will be connected on the sub mains through hydrants at a spacing of 0.75 m . Length of each drip line (drip pipe) is 30.00 m . Each drip line is equipped with a mini valve connected on the interface of the sub main line and the drip line . There are going to be 93 drip line x 2 sides = 186 drip lines complete with end caps and mini valves (¾" drip lines) .
- The system will be equipped with sand and screw filters of mesh 150-200 appropriately placed .
- The spacing between drip emitters (emission holes) 40 cm , each drip line will have 75 emission holes. Hence provide ,supply and install followings:
- Main and sub main pipe lines to the required length.
- Elbows, unions , sockets , nipples , valves any other related accessories .

1. **Objectives :**

To ensure that 02 solar powered mini water yards with drip irrigation systems are successfully completed and fully functionality as expected and communities have easy access to water for crop production

2. **Tasks and expected days of work**

- The contractor is expected to carry out the job accordingly, while assigning specific and clear task of civil works to specific team group e.g water engineer/hydrogeologist for test geophysical study pumping and determining the aquifer behavior, metal fabrication work, masonry for tower footings and water collection fountains, plumbers for general plumbing work, drillers and A/ drillers for drilling operations . The whole work is expected to take 21 days to final completion and handing over. A focal person is expected to be available at any point in time at the site. Detail work plan is attached. The expected time to complete the job is 60 days .

3. **Roles and responsibilities**

- Is solely responsible for provision of all the materials, services and personnel needed for the work, ensure that all materials, services and personnel conform to approved grade, skills and standards.
- Responsible for the team deployed for the work, all their basic needs are catered for, should not interfere with the work.
- Weekly update to IRSS of work progress, Challenges and constraints affecting work progress should be reported to IRSS coordinator in Narus and noted.

IRSS

- Responsible for coordination with authorities, communities and other stake holders in all matters pertaining to the construction work.
- Conduct regular site visits, inspection of all materials and services involved in the work.
- Ready to provide guidance and advice and support as deemed necessary .

6 . Interface

- Ensure there is very good line of communication and coordination between Islamic relief and the contracted company, is well established.
- All communication and coordination should be done through the company focal person assigned for that in the field and IRSS designated focal person
- No direct communication between any company staff and IRSS.
- IRSS engineer can be directly contacted any time for consultation and advice.

7. Reporting

- Contractor to report on each phase of work successfully completed, this includes: Phase (1) Geophysical survey Phase (2) drilling of boreholes & test pumping and. installation of the submersible pumps Phase (3) civil works on tank stands, tank installation , plumbing work from pump to tank and from tank to drip main line Phase (4) Installation of drip systems (5) testing of the system (6) final touches , decommissioning and handing over .
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8. Handing over

- Final inspection will be jointly conducted with the directorate of rural water supply and public utilities , agriculture and leaders of farmers groups for respective sites .various components of the facility will be inspected and verified, according to the check list . In case of defaults in any component, has to be rectified before final handing over is done.
- After the facility is handed over , IRSS will carry out post construction monitoring for a period of three months before the liability (retention) money is settled .
- Each system will be branded with two visibilities , one sign post up on the tank stand frame and one sign post near the main entrance to the farm .

Requirements for Bidding

Mandatory Documents

The consultant/contractor shall submit the proposal with the following documents:-

i. Certificate of incorporation
ii. Tin

iii. Drilling License from the ministry of water Resource and Irrigation.
iv. Tax Clearance
v. Trade license
vi. Recommendation from other NGOs preferably similar works.
vii. Latest Bank statement last three months

Language of the Bid

The bid, all correspondence & documents relating to the bid shall be in English language.

Cost of Bidding

The bidder/s shall bear all costs associated with preparation and submission of its bid. IRSS will in no case be responsible for those costs, regardless of the conduct or outcome of the bidding process.

Clarification of Bidding Documents

A consultant/contractor requiring any clarification shall notify IRSS in writing or by telephone & IRSS will respond in writing to any request prior to the deadline.

Amendment of Bidding Document

At any time prior to the deadline for submission of bids IRSS may for any reason whether at its own initiative or in response to a clarification requested by a prospective bidder, modify the bidding documents & will be binding on them. The amendment will be notified in writing or by email or letter to all prospective bidders, who have received the bidding documents & will be binding on them. In order to allow prospective bidders responsive time in which to take the amendment into account in preparing their bids, IRSS may, at the discretion, extend the deadline for the submission of the bids.

Bid Currencies

The bids prices shall be quoted in US Dollar (USD).

Bids Prices

- The bidders shall indicate the unit price where possible and the total bid price of the Work separately (for each work).
- Prices quoted by the bidder shall be fixed for a period of four months i.e. during evaluation, award and implementation.

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Award Criteria

The contract shall be awarded to the most economically advantageous tender/bid that meets quality, specification, delivery, price and good terms of payment. *IRSS is not bound to accept the highest, lowest or any other tender or bid, and is not bound to give any reasons thereof.*

IRSS's right to vary quantities at the time of the award

IRSS reserves the right at the time of award of contract to increase or decrease by up to 10% the quantity of work specified in the technical specification.

IRSS's right to accept any bid and reject any or all bids

IRSS reserves the right to accept any bid and to annul the bidding processes and reject all bids at any time prior to award of contract, without, thereby incurring any liability to the affected bidder or bidders or any obligation to inform the affected bidder or bidders on the grounds of its action.

Tender Schedule

Task	Date
Advertising of Tender	20th April 2019
Closing of Tender	30th April 2019
Opening of Tender	1st May 2019
Evaluation	3rd May 2019
Award	6th May 2019

The deadline for submitting bids/quotation is **30th April 2019** Bids to be sent to IRSS office in a clearly mark

Tender Ref: IRSS-FLIP/001/04/2019

Tender for construction of solar powered mini water yard with drip irrigation components.

Chairman

Tender Committee

Juba

Islamic Relief Worldwide
South Sudan

Bids can also be submitted in soft using the following email address **IRSS.Tender@islamic-relief.or.ke**. The sealed envelopes shall be dropped at IRSS Office Tender Box, Plot *No. 95 Block (AX VII) Haijallaba, Next to State Ministry of Labor and Human resource Development, Central Equatorial State, Juba.* The deadline for submitting bids/quotation is **30th April 2019 at 4.00 pm.**

BILL OF QUANTITY FOR CONSTRUCTION OF SOLAR POWERED MINI WATER YARD WITH DRIP IRRIGATION SYSTEM.

Project: Food security &livelihood improvement project (FLIP)
Project location: Narus – kapoeta East County

Ref Number	Item description	Quantity	Unit	Unit cost - USD	Amount - USD
Item (1) Water supply system development					
01	Preliminaries – physical assessment and survey of the site.	01	job		
02	Mobilization – transportation of whole drilling unit to site, erecting of drilling equipment and other support units.	01	job		
03	Carry out hydro geophysical survey of the site to identify the most potential location for the borehole drilling.	01	job		
04	Carry out drilling of the borehole 9 inches diameter ,	120	Meter		
05	supply and install 6 inches nominal diameter UPVC screen casing with end cap	09	Meter		
06	Supply and install 6 inches plain UPVC casings with threads.	111	meters		

07	Supply and install 8 inches diameter plain permanent casing, including sanitary seal of grout cement	06	Meters		
	Provide and insert filter gravel packing 2mm-4mm size , well compacted ,	1.5	M^3		
08	Mobilization – carry out pumping test , 6 hours step draw down and 4 hours constant discharge test – including installation , removal of pumping test equipment and water level observation – for not less than 10 hours .	01	job		
09	Supply and install solar powered submersible pump of capacity 1,400 Watt , single phase , Q= 3,500 liters/hours H= 100 meters , HP 2-3 - corresponding to the capacity of the well drilled to 80m- 120 m head .	01	set		
10	Supply and install total of 1,400 Watts – solar panels(preferably 100-120 Watt panels) corresponding to pump capacity ditto but CU box , stands , cables CU and other accessories .	01	set		
11	Provide , manufacture and install tank stands as per specifications in the technical notes	01	set		
12	Two PE tanks 5,000 liters each .	02	Pieces		

13	Supply and install 2 "G.I.pipes from tank out let to ground level connecting to main line to drip system , complete with 2" gate valve .	2"	Meters		
14	Supply and carry out fencing around the tank to perimeter 24 m – provision of 21/2 " angled iron bars , chain link , razor wire , line wire , gravel , cement , sand etc. .	01	no		
15	Decommission – demobilization of the drilling unit and support systems. Removal and disposal of extra drilling wastes and well-disposed off, back fill mud pits for mud drilling.	01	no		
Subtotal (1) Water system development					
Item (2) drip system development					
16	Supply and install 2" main lines from the tank out let at the ground level to the filter system complete with relevant fittings.	5.00	meter		
17	Provide and install sand filter and screw filter of 150-200 mesh complete with accessories and fittings.	01	Set		
18	Supply and install 2" HDPE main lines running straight through the center of the field, complete with fittings and provision of hydrants for connecting drip pipes.	70.00	meters		
19	Supply and install 2No 11/2inches HDPE sub main line running parallel to the main line 70.00 meter long , complete with hydrants provision of connection of drip pipes , Provision of 4 no 11/2 inches gate valves as specified in the technical drawing	140	Meter		

20	Allow for provision of ¾ Inches drip lines , 93 pieces at each side x 2 = well connected to submain lines as specified in the technical drawing .= 186 no drip pipes and each 30.00 meter long . Each drip pipe equipped with mini valve and end caps .Allow for provision of all fittings and accessories.	186 (5,580 m)	Pieces		
21	Provide and allow for setting up of one water collection point 4 meter away from the main line – 1" PE pipe 0.80 m high completed with ¾" water tape, in 1:2:4 plain concrete work for 1.00mx1.00m apron with elevated edge . Allow for provision of all fittings	01	no		
22	Allow for provision of two sign posts as described : sign post (a) height 1.00m x length 1.80 m , welded firmly on the tank frame work sign post (b) height 1.00 m x length 1.80 m on metal legs 1.80 m high from ground level , this sign post is firmly fixed near the entrance gate to the farm land	02	Pieces		
23	Allow for provision of flexible hose pipes ¾ inches , this is for flush irrigation	100	Meter		
24	Decommissioning and handing over	01	Occasion		
Subtotal (2) drip system					
Grand total : subtotal(1) + subtotal(2)					

Note:

- **This BOQ provided is for one site only (x 2 for the two sites)**
- **Refer to the technical notes .**

Project: " Food security and livelihood improvement project (FLIP) **"**

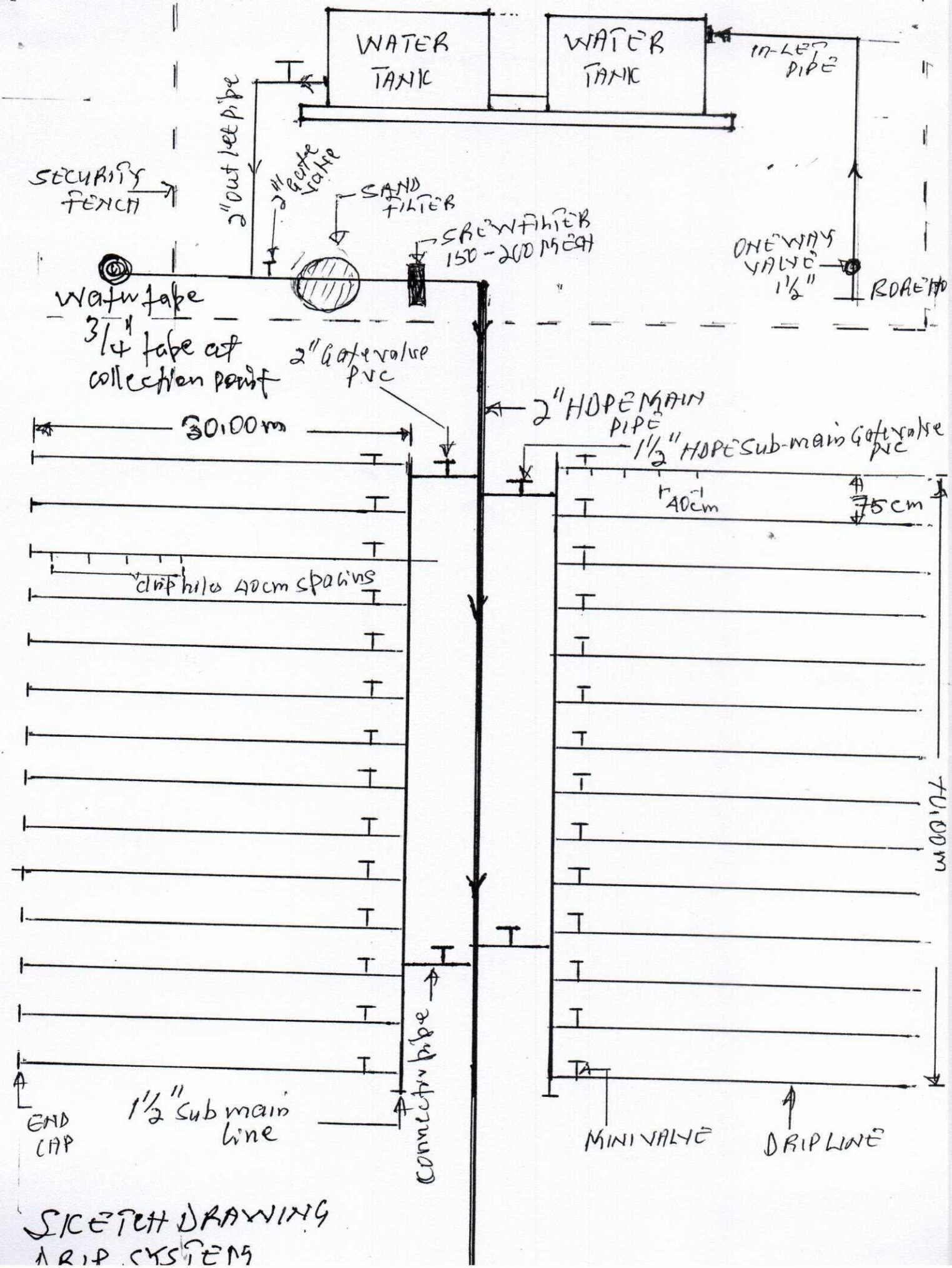
Location: Narus – Kapoeta east county .

Implementation plan: Construction of two solar mini water yards with drip irrigation systems

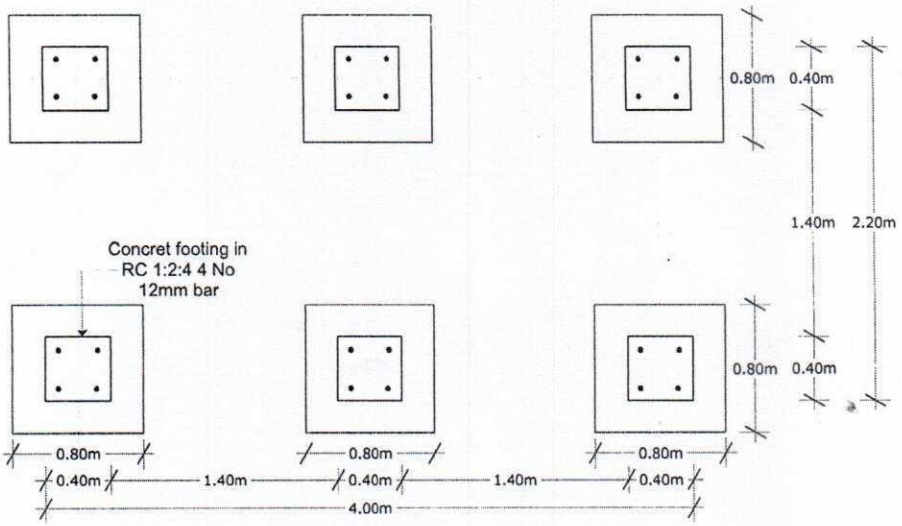
Activity #	Activity description	Months												Comments
		May				June				July				
		Wk 1	Wk 2	Wk 3	Wk 4	Wk 1	wk 2	Wk 3	Wk 4	Wk 1	Wk 2	Wk 3	Wk 4	
1.00	Mobilization of equipment, personnel and materials including movement of drilling equipment to project sites.													
2.00	Site survey , hydro geophysical survey to identify the most promising site for drilling of high yield borehole													.
3.00	Drilling and development of two boreholes well completed including test pumping, installation of submersible pumps													
4.00	Civil work on stands – includes excavation and concrete work on footings , welding works , erection of stands in place , installation of the tanks , solar systems , plumbing													

	works													
5.00	Laying up of drip irrigation system in place													
6.00	Testing of the facilities and handing over													

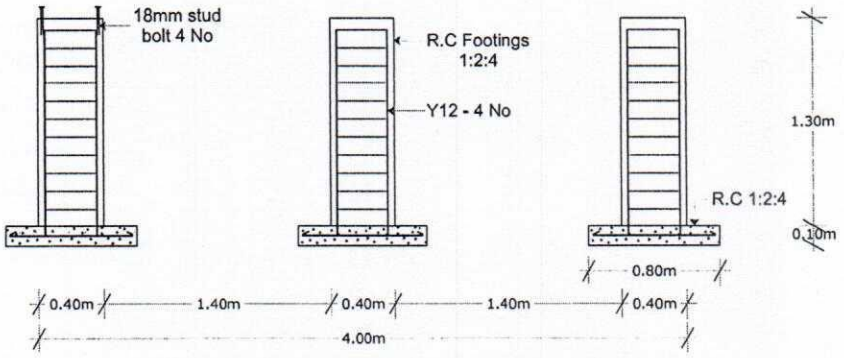
Prepared by : James Jamil



SKETCH DRAWING
DRIP SYSTEMS



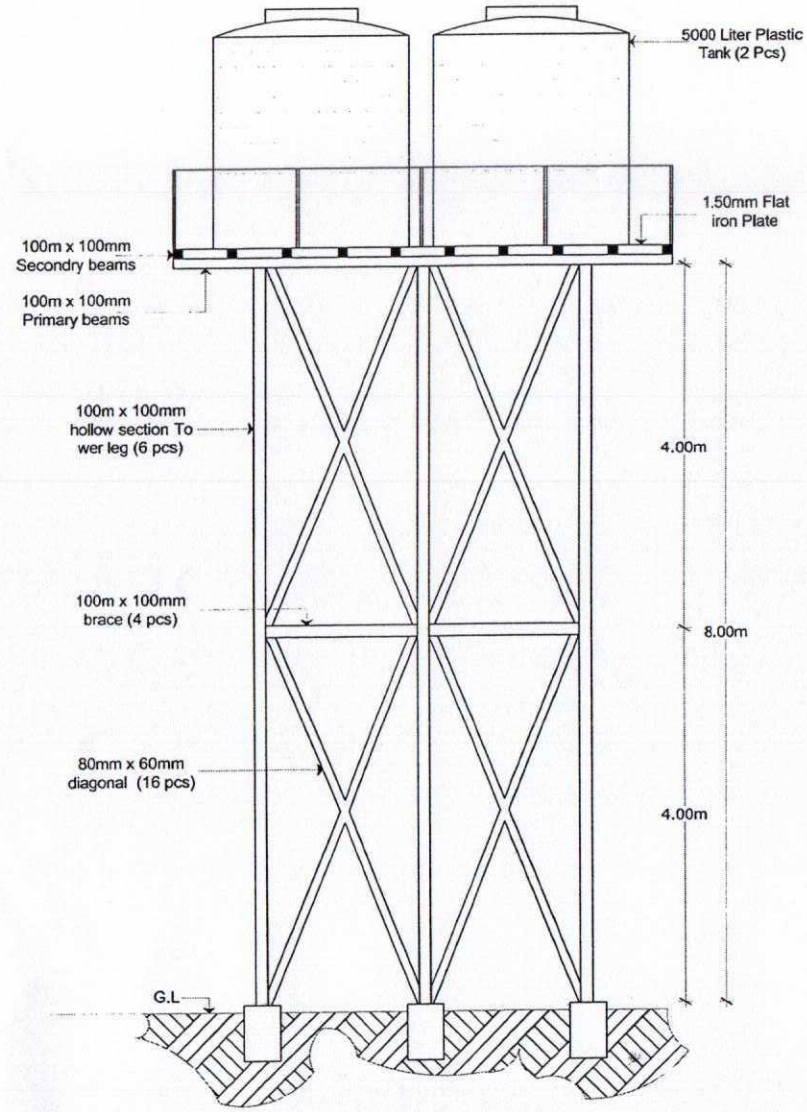
GROUND PLAND
FOOTING DETAILS



SECTION A - A
CROSS - SECTION

Note

All Measurement in Meters



PLAN FOR WATER YARD

Note

All Measurement in Meters